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Can Local Infiltration Influence Postoperative Recovery in Upper Blepharoplasty? A Case Series Study on Two Different Infiltration Methods

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Abstract

Upper blepharoplasty is a common aesthetic surgery procedure which is frequently performed wide awake, under local anesthesia. However, advancements concerning the patients' perception during and after the procedure are still needed. This study aimed to evaluate the efficacy of a new method for local anesthetic infiltration in the upper eyelid comparing it to the traditional needle injections.

A prospective, randomized, and clinical trial was conducted on 20 patients who underwent upper eyelid blepharoplasty in local anesthesia. After randomization, one eyelid was infiltrated using a Nanosoft technology needle, while on the contralateral side traditional needle injections were performed. Preoperative demographics, Fitzpatrick, and SNAP test were recorded. Postoperative patients visual analog scale (VAS) scores for both infiltration methods and ecchymosis and edema were recorded. Our results showed that the mean VAS scores for perceived pain were significantly lower on the eye infiltrated with Nanosoft technology ($p < 0.05$). Furthermore, the rate of postoperative ecchymosis and edema were also significantly lower with Nanosoft technology ($p = 0.0012$ and $0 = 0.0197$, respectively). All 20 patients were satisfied with outcomes, and there were no major complications or need for a revision.

Our case series study suggests that Nanosoft technology may be a more effective and efficient method for the local anesthetic infiltration in upper eyelid blepharoplasty in reducing discomfort and downtime for the patient.

Keywords

- nanosoft
- upper blepharoplasty
- local anesthesia

Blepharoplasty is among the most popular plastic surgery procedures performed worldwide.[1] The reason is because it provides fast and satisfactory results and can be performed in most cases as an outpatient surgery in local anesthesia. However, sometimes patients are concerned about the local anesthetic injection that can even lead them to opt for surgery under general anesthesia or under sedation or, in some cases, to avoid the surgery altogether.[2–5] A proper management of pain is also crucial from the surgeon's point of view, as patient compliance will be greater if no discomfort is perceived.

Different methods have been proposed in order to decrease the pain related to local anesthetic infiltration and to

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prevent the occurrence, after surgery, of the most common complications in blepharoplasty: ecchymosis and edema.[3,6–16] Successful results have been reported for these methods; however, concerning pain during local anesthetic infiltration, only a partial reduction has been achieved.

With our prospective observational study, we propose a new method for local anesthetic infiltration in upper eyelid blepharoplasty and evaluate its efficacy in comparison to traditional needle injections. The aim of this novel method is to reduce the perception of pain during anesthetic infiltration to zero and to prevent postoperative ecchymosis and edema allowing also for a faster recovery and therefore shorter downtime.

Materials and Methods

Study Design

A prospective, randomized, and controlled clinical trial was conducted on 20 patients who underwent primary upper eyelid blepharoplasty between November 2021 and January 2022 in an outpatient setting. All procedures have been performed by the same surgeons (A.G. and R.D.). Patients included in the study satisfied the following inclusion criteria: age over 18 years, bilateral upper eyelid laxity requiring surgical intervention for correction, no previous surgical procedures on the upper eyelids, no contraindication for surgery under local anesthesia only. Each enrolled patient provided informed consent for the study and the surgical procedure. Exclusion criteria included any comorbidity and any known allergy to local anesthetics.

Patients received anesthesia prior to surgery through two different methods with lidocaine with adrenaline: one of the two upper eyelids received infiltration of local anesthesia using Nanosoft technology (Fillmed laboratories, Paris, France) (NS), while on the other side, a classical 30 gauge needle (B | Braun, Sterican, Melsungen, Germany) was employed for infiltration of local anesthetics (ND). The choice of anesthesia method was determined previously to the surgery randomly.

Preoperative data, including demographics, Fitzpatrick classification (I–VI) and Snap test (negative, mild, moderate, and severe) were recorded. Afterward, postoperative data including patients' discomfort during the procedure (visual analog scale [VAS] score), presence of postoperative ecchymosis (negative or positive), and postoperative edema of the orbicularis oculi muscle (negative or positive) were recorded. To evaluate the perceived pain during the local anesthetic infiltration, patients self-evaluated their discomfort using a VAS Score (from 0 to 10, with 0 meaning no pain and 10 unbearable pain), these values were asked 1 hour after surgery of each patient and then recorded. The objective evaluation of the presence of postoperative ecchymosis and edema was evaluated by a surgeon who was blinded to the purpose of the present study. The total follow-up time was 10 weeks for each patient.

The study was conducted as a quality assessment study, and all procedures performed in the study involving human participants were carried out in accordance with the ethical standards of the national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Infiltration and Surgical Technique

Preoperative patients were instructed to not assume any drugs which had an effect on blood clotting. All patients received approximately 4 mL local anesthetic per eyelid through a 5 mL luer lock syringe with 0.3% lidocaine and 1:650,000 adrenaline. Each eyelid was operated 5 minutes after the injection of the local anesthesia was performed. In each patient, the skin excess, marked preoperatively in the upright position,[17] was excised with a 15 blade; afterward, part of the orbicularis muscle was resected. Lastly, the septum was opened and when necessary excessive fat pads were removed. After accurate hemostasis was performed, the septum was closed with a single stich 5/0 Vicryl Rapid (Ethicon Raritan, NJ) and the skin was sutured with a continuous suture Ethilon 6/0 (Ethicon Raritan, NJ). After surgery, Steri-Strips (3M, Saint Paul, MN), and cool pads were applied. Patients were instructed to apply cool pads four times a day for 10 minutes for the first 2 days, as well as be aware of any exposition to heat sources and sleep in a slight more upright position with the head. After 7 days, surgery stiches and Steri-Strips were removed. After surgery, patients were also instructed to avoid any sport activity and direct eye exposure to the sun or other heat sources.

Statistical Analysis

Statistical analysis was performed with Microsoft Excel for Mac (Microsoft Corp, Redmond, Washington). The Student *t*-test was applied to compare the values for the VAS scale which evaluated the level of discomfort of the patients during infiltration of local anesthesia. Fisher's exact test has been employed instead to ascertain the statistical significance of the values related to the presence of postoperative ecchymosis and orbicularis muscle edema. Results were deemed statistically significant at $p < 0.05$.

Results

A total of 20 patients underwent bilateral upper eyelid blepharoplasty with anesthetic side-by-side randomization. Ten of the twenty patients were females, and the average age was 56 years old (range, 43–78 years). The majority of patients had a Fitzpatrick type III (55%). The mean SNAP values for both eyes were 2.1 with a standard deviation of 0.7 for the right eye, while 0.8 for the left. All preoperative data of each patient are shown in ►**Table 1**.

From our cohort, the VAS score as well as the postoperative ecchymosis and edema showed a high statistically significant difference in the NS infiltration group when compared to the traditional infiltration. The VAS score showed a *p*-value of <0.05 while the ecchymosis of 0.0012 and the edema of 0.0197. The parameters of all patients are resumed in ►**Table 2**.

Table 1 Preoperative data

	Male/Female	Age	Fitzpatrick (I–VI)	SNAP test – Right eye (0 = negative, 1 = mild, 2 = moderate, 3 = severe)	SNAP test – Left eye (0 = negative, 1 = mild, 2 = moderate, 3 = severe)
Patient 1	F	45	II	1	1
Patient 2	F	63	IV	2	3
Patient 3	M	65	IV	3	2
Patient 4	M	47	III	1	1
Patient 5	F	60	III	2	2
Patient 6	M	59	III	2	2
Patient 7	F	55	IV	2	1
Patient 8	F	62	IV	3	3
Patient 9	M	50	III	2	3
Patient 10	M	63	III	2	2
Patient 11	M	56	III	1	1
Patient 12	F	64	IV	2	2
Patient 13	M	78	III	3	3
Patient 14	F	43	VI	1	1
Patient 15	F	55	II	2	2
Patient 16	M	65	III	2	2
Patient 17	M	77	III	3	3
Patient 18	F	43	II	2	2
Patient 19	F	60	III	3	3
Patient 20	M	49	III	2	2

Abbreviation: VAS, visual analog scale.

No patient required revision operation or suffered major complications. Furthermore, all patients were satisfied with the aesthetic outcomes at the last follow-up visit.

Discussion

In recent years, the popularity of upper eyelid blepharoplasty has soared, making it one of the most in-demand cosmetic procedures. The technical aspects of the surgery have been greatly defined and improved, but there is still room for enhancement when it comes to the patient experience during the perioperative phase. Efforts can be made to reduce pain perception associated with local anesthesia and minimize the occurrence of ecchymosis and periorbital edema, which can prolong the recovery time.

Aiming at creating a more comfortable and fulfilling surgical journey for our patients who undergo upper blepharoplasty, we tested a new method for local anesthetic infiltration which has been proven to be advantageous not only from the point of view of pain perception but also because it allows, as shown, a faster recovery.

Our patients have been evaluated for what concerns postoperative ecchymosis and edema by a surgeon who was blinded to the purpose of the present study in order to render as objectively as possible the evaluation. Despite this effort, the evaluation of the aforementioned parameters by means of only two grades (yes or not) is certainly limiting for the results.

Nonetheless, our results were remarkable, with 100% of our patients reporting a score of 1 on the VAS scale indicating no pain at all during the infiltration of local anesthesia in the eyelid where Nanosoft was employed. This shows that Nanosoft needles are excellent for patients who are anxious about this type of procedure.

Local anesthesia is often considered the main concern in upper blepharoplasty, as many patients fear the procedure due to the potential for pain and discomfort. Solutions we can adopt in these terms involve either a specific action on the anesthetic agent itself or on the vehicle used to administer it. The addition of a buffer solution to the anesthetic agent to decrease the burning sensation correlated to low pH levels has been proposed in the literature; however, different problems linked to the chemical stability of the agent and to a potential reduction of its efficacy and possible allergic reactions have been reported.[3,8,18] On the other hand, efforts have been made to find a more suitable and comfortable method for infiltration, such as injection with a blunt tip cannula, slow rate of injection, and usage of small gauge needles.[3,6,7] Indeed, Yu et al, in their randomized clinical trial reported a mean VAS scores of 5.48 and 4.64 for pain assessed

Table 2 Postoperative data

	VAS score – NS side	VAS score – ND side	Ecchymosis – NS side	Ecchymosis – ND side	Edema – NS side	Edema – ND side
Patient 1	1	4	–	+	–	+
Patient 2	1	2	–	+	–	–
Patient 3	1	4	–	+	–	+
Patient 4	1	4	–	–	–	+
Patient 5	1	2	–	–	–	–
Patient 6	1	4	–	+	–	+
Patient 7	1	2	–	–	–	–
Patient 8	1	2	–	–	–	–
Patient 9	1	4	–	+	–	–
Patient 10	1	1	–	+	–	+
Patient 11	1	2	–	+	–	+
Patient 12	1	2	–	+	–	–
Patient 13	1	2	–	–	–	+
Patient 14	1	5	–	–	–	–
Patient 15	1	2	–	–	–	–
Patient 16	1	1	–	–	–	–
Patient 17	1	2	–	–	+	–
Patient 18	1	3	–	–	–	–
Patient 19	1	5	–	+	–	–
Patient 20	1	1	–	–	–	+

Abbreviations: ND, traditional needle 30 guage; NS, Nanosoft; VAS, visual analog scale.

at sites of sharp- and blunt-needle injections, respectively ($p = 0.002$).[7]

In the past years, since fast recovery became a common requirement for patients, several strategies to decrease and prevent ecchymosis and edema in upper eyelid blepharoplasty were investigated. However, these measures such as the use of arnica, bromelain and vitamin K creams, the application of cold compresses immediately after surgery, the avoidance of blood thinners and close monitoring of blood pressure, and elevation of the head in the period after surgery have brought only to a partial success.[9–11,19] Regardless all these, methods have a positive effect in reducing edema and ecchymosis; in our opinion, they do not block the occurrence at the beginning, while the use of Nanosoft micro needles seems to produce exactly this effect. Indeed, the absolute noninvasive infiltration of local anesthetic, as well as the very precise administration rather than being spread throughout the entire area, are favorable in preventing any reactive process. In addition, these novel needles produce minimal discomfort for the patients and prevent therefore also transitory blood pressure increase due to pain which may produce more ecchymosis.[20]

Despite our notable results, our study presents important limitations. Indeed, we included only a small cohort of patients and more importantly, as already mentioned, in our case series, the definition of ecchymosis and swelling has been evaluated by just two grades.

Overall, Nanosoft microneedles are a promising new technology that could greatly improve the experience for not only upper blepharoplasty for patients. With the use of Nanosoft microneedles, patients can have the procedure done with less pain and discomfort, less ecchymosis and edema, and a faster recovery, thus reducing the number of negative side effects and increasing the overall satisfaction of the patients.

Conflict of Interest
None declared.

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